

What Is Claimed Is:

1. An isolated and purified DNA molecule encoding atrazine chlorohydrolase; the DNA molecule hybridizes to DNA complementary to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M

5 Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.

10 2. The isolated and purified DNA molecule of claim 1 encoding the atrazine chlorohydrolase having an amino acid sequence shown in Figure 7 (SEQ ID NO:2).

15 3. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ ID NO:1) beginning at position 236 and ending at position 1655.

4. The isolated and purified DNA molecule of claim 1 having the nucleotide sequence shown in Figure 6 (SEQ. ID NO:1).

20 5. An isolated and purified protein having a molecular weight of about 245 kilodaltons that converts atrazine to hydroxyatrazine.

6. The isolated and purified protein of claim 5 which is a homotetramer.

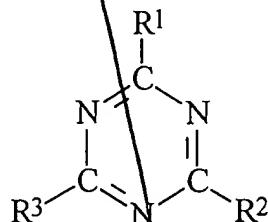
25 7. The isolated and purified protein of claim 5 which has the amino acid sequence shown in Figure 7 (SEQ. ID NO:2).

8. The isolated and purified protein of claim 7 bound to an immobilization support.

- Rub C3*
9. An isolated and purified protein encoded by the DNA molecule of claim 1.
  10. An isolated and purified protein encoded by the DNA molecule of claim 3.
  - 5 11. A polyclonal antibody preparation produced from the isolated and purified protein of claim 5.
  12. A polyclonal antibody preparation produced from the isolated and purified protein of claim 7.
  - 10 13. A vector comprising the DNA molecule of claim 1.
  14. The vector of claim 13 wherein the DNA molecule of claim 1 is derived from a *Pseudomonas* strain.
  - 15 15. A non-*Pseudomonas* bacterial cell comprising the vector of claim 14.
  16. An isolated and purified oligonucleotide of about 7-300 nucleotides which hybridizes to DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.
  - 25 17. A method for the purification of atrazine chlorohydrolase in at least about 90% yield consisting of a step of adding ammonium sulfate to an aqueous cell-free extract of an atrazine chlorohydrolase-containing bacterium.

18. The method of claim 17 wherein ammonium sulfate is added in an amount of no greater than about 20% of saturation.

19. A method for the degradation of compounds have the following general formula:



wherein R<sup>1</sup> = Cl, R<sup>2</sup> = NR<sup>4</sup>R<sup>5</sup> (wherein R<sup>4</sup> and R<sup>5</sup> are each independently H or a C<sub>1-3</sub> alkyl group), and R<sup>3</sup> = NR<sup>6</sup>R<sup>7</sup> (wherein R<sup>6</sup> and R<sup>7</sup> are each independently H or a C<sub>1-3</sub> alkyl group), with the proviso that at least one of R<sup>2</sup> or R<sup>3</sup> is an alkylamino group; said method comprising adding atrazine chlorohydrolase to a sample containing said compound.

20. The method of claim 19 wherein the sample is a soil sample.

21. The method of claim 20 wherein the soil sample is contaminated with a nitrogen-containing fertilizer.

22. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding a recombinant bacterium that expresses atrazine chlorohydrolase.

23. The method of claim 19 wherein the step of adding atrazine chlorohydrolase comprises adding the bacterial cell of claim 15.

- Part C4*
24. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.
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25. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence encoded by a DNA molecule having a compliment that hybridizes to a DNA having the sequence shown in Figure 6 (SEQ ID NO:1), beginning at position 236 and ending at position 1655, under the stringency conditions of hybridization in buffer containing 0.25 M Na<sub>2</sub>HPO<sub>4</sub>, 7% SDS, 1% BSA, 1.0 mM EDTA at 65°C, followed by washing with 0.1% SDS and 0.1x SSC at 65°C.
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26. An isolated and purified protein that converts atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.
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27. An isolated and purified protein and biologically active derivatives thereof that convert atrazine to hydroxyatrazine, wherein the protein comprises an amino acid sequence having greater than about 80% sequence identity to the amino acid sequence depicted at SEQ ID NO:2.
- Part C5*
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